

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of)	
)	
Amendment of the Commission's Rules with)	GN Docket No. 12-354
Regard to Commercial Operations in the 3550-)	
3650 MHz Band)	

Reply Comments of Nokia Siemens Networks US LLC

Nokia Siemens Networks US LLC (“Nokia Siemens Networks”) hereby submits these brief reply comments in response to the initial comments filed pursuant to the Commission’s Notice of Proposed Rulemaking (“NPRM”)¹ seeking comment on commercial use of the 3550-3650 MHz spectrum band (“3.5 GHz Band”). Numerous commenting parties agree with Nokia Siemens Networks that the 3.5 GHz Band holds significant potential to expand the capacity and reach of current and future commercial mobile broadband networks in order to meet the constantly escalating demand for high quality mobile connectivity.

Summary

Nokia Siemens Networks continues to believe that the 3.5 GHz Band appears well suited to support commercial mobile broadband networks, including although not necessarily limited to small cell deployments. Harmonization of the 3.5 GHz allocation with existing global 3GPP bands would leverage a growing TD-LTE ecosystem and help achieve economies of scale that should lower costs and reduce time-to-market for equipment and devices. Mobile network

¹ *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, GN Docket No. 12-354, Notice of Proposed Rulemaking, FCC 12-148 (rel. Dec. 12, 2012) (“NPRM”).

operators therefore should be afforded an opportunity to meaningfully utilize spectrum in this band to enhance mobile broadband coverage and capacity. A likely prerequisite for wide scale use by operators will be some level of guarantees around spectrum availability and usability. While exclusive licensing of the band for commercial services very well may prove difficult to achieve in some locations at least for the foreseeable future, Nokia Siemens Networks believes that the developing record in this proceeding lends support for its call for consideration of a licensed sharing model. In particular, Authorized Shared Access (“ASA”) appears well suited to help meet the market’s current and future mobile broadband capacity requirements.

LTE technology includes interference mitigation features that potentially could be leveraged in sharing situations. However, exploration of such opportunities is held back by a lack of clarity regarding the characteristics of incumbent users. The commercial wireless industry and government users have worked together to overcome spectrum sharing challenges in the past and will have to do so in this situation if use of the 3.5 GHz Band is to achieve its maximum potential.

Categorization of Spectrum Users

In its initial comments,² Nokia Siemens Networks encouraged the Commission to consider commercial mobile network operators as likely users of the 3.5 GHz Band, and to include them in any classification of spectrum users with quality of service (“QoS”) requirements. Numerous commenting parties agree with this recommendation.³ When compared to the initial proposals in the *NPRM*, expanding any prioritized access class to include network

² Comments of Nokia Siemens Networks US LLC (filed February 20, 2013).

³ See, e.g., Comments of AT&T (filed February 20, 2013) at 7-9; Comments of Ericsson (filed February 20, 2013) at 5-6; Comments of Alcatel-Lucent (filed February 20, 2013) at 3; Comments of Mobile Future (filed February 20, 2013) at 6.

operators holds the potential to broaden the ecosystem and increase the likelihood of widespread use of the 3.5 GHz Band, to the benefit of all users. Defining eligibility for any preferred class of user too narrowly unnecessarily threatens the viability of an overall market for the band.

Spectrum Access System

In its initial comments, Nokia Siemens Networks observed that the commercial mobile market has blossomed under a framework of access to exclusively licensed spectrum. This paradigm is driving the deployment of 4G mobile broadband networks across the country and globe and should continue to be prioritized. While the potential for exclusively licensing some or all of 3550-3650 MHz for commercial use should be explored by the Commission⁴ and may be possible, Nokia Siemens Networks acknowledges that a framework likely is needed to maximize new commercial use of this band while protecting certain legacy systems.

The *NPRM* includes discussion of the appropriate spectrum access system (“SAS”) to govern use of the 3.5 GHz Band. Nokia Siemens Networks responded to the Commission’s call for comment on the Authorized Shared Access (“ASA”) concept.⁵ Nokia Siemens Networks expressed its view that an ASA model could be an ideal solution for enabling deployment in the 3.5 GHz Band. It offers a better defined environment for deployment compared to the Commission’s proposed three-tier approach, the complexity of which threatens to impede the rollout of mobile services in the band. This is particularly true if ASA is implemented as envisioned to enable a two-tier spectrum access approach. ASA allows the spectrum to be used efficiently at all times on a nationwide or license-wide basis. A key feature of ASA is that it

⁴ See, e.g., Comments of T-Mobile (filed February 20, 2013) at 4-5.

⁵ Licensed Shared Access (“LSA”) is the terminology being used in standardization efforts in the European Telecommunications Standardization Institute (“ETSI”).

offers predictable QoS levels for all spectrum users as each has exclusive access to that spectrum at a given location and/or at a given time.

In its initial comments, Nokia Siemens Networks laid out how ASA works and specifically how it could be adapted to the 3.5 GHz Band.⁶ Other commenting parties also point to ASA or LSA as a potential SAS for enabling effective use of this band.⁷ Implementing ASA as the SAS should increase the attractiveness of the 3.5 GHz Band to a broad range of users with QoS requirements, including mobile operators, which in turn will help drive the scale necessary for the development of an end-to-end ecosystem.

Interference Mitigation Features of LTE

The standards for LTE technology developed in 3GPP include interference mitigation features that potentially could be leveraged in an environment where sharing is the only option for expanding access to spectrum. In particular, the LTE Self-Organizing Networks (SON) standards provide network intelligence, automation and network management features in order to allow LTE networks to adapt to varying radio channel conditions.⁸ LTE SON allows:

- Self-Configuration: dynamic plug-and-play configuration of newly deployed eNBs. The eNB will by itself configure the Physical Cell Identity (PCI), frequency, power, etc.
- Self-Optimization: optimization of coverage, capacity, handover and Inter-Cell Interference Coordination.

⁶ Comments of Nokia Siemens Networks at 15-21.

⁷ See Comments of Qualcomm generally; Comments of Ericsson at 9-10; Comments of the Information Technology Industry Council (filed February 20, 2013) at 4.

⁸ *Self-Optimizing Networks: The Benefits of SON in LTE*, 4G Americas White Paper (July 2011), available at <http://www.4gamericas.org/documents/Self-Optimizing%20Networks-Benefits%20of%20SON%20in%20LTE-July%202011.pdf>.

- Self-Healing: automatic detection and removal of failures and automatic adjustment of parameters.⁹

The SON standards are a work in progress, and SON-related functionality is continuously being expanded through the subsequent releases of the LTE standard, Release 11 and beyond, to cover all key aspects related to network management, troubleshooting and optimization in heterogeneous networks, of which small cells are an integral part. In addition, the LTE standards support advanced terminal receivers for interference cancellation, which are continuously being enhanced to improve user experience.

The SON mechanisms -- allowing the LTE network to configure, optimize and heal itself, advanced receiver standards and other features can be further enhanced and combined with the SAS to allow LTE to operate in the incumbent signal environment in the 3.5GHz spectrum band by mitigating interference to and from the incumbent systems. However, in order to take advantage of such features, the characteristics of incumbent systems need to be understood to a certain degree.¹⁰ Meaningful exchange of information is the only way that the notion of sharing spectrum may move from an interesting idea into a reality.

Nokia Siemens Networks observes that the commercial wireless industry and government users have faced similar spectrum sharing challenges previously. A prime example is in the 5GHz UNII band in which commercial systems have to share the spectrum with existing radar systems. The solution, Dynamic Frequency Selection (DFS), jointly developed by the wireless industry and government, was made possible to a large extent because the incumbent users provided radar “signatures” or characteristics needed to develop the sharing mechanism.

⁹ See <http://www.3gpp.org/SON>.

¹⁰ See Qualcomm Comments at 3.

Conclusion

Nokia Siemens Networks reiterates its view that the 3.5 GHz Band has the potential to enhance mobile broadband networks across the U.S., including through densification of network coverage via small cell deployments. As the Commission continues to receive feedback on its initial proposals for granting access to this spectrum, Nokia Siemens Networks urges the Commission to refine such proposals consistent with an objective of widespread utilization of the band and the development of a sustainable commercial ecosystem.

Respectfully submitted,

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